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(56) Documents Cited
EP 0346859 A2 WO 93/04348 A1 WO 92/08208 A1

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(54) Computer input mouse.

(57) A mouse for inputting information to a computer comprises a rotatable tracker ball 1 for contacting a reference surface and a housing, a first part 2 of which defines a hole through which the tracker ball may protrude, and a second graspable part 3 of which is resiliently moveable relative to the first part in a plurality of directions. The housing may itself consist of resilient material, or may be in two parts resiliently coupled to one another by coil, leaf or rubber springs. Relative movement of the housing parts 2, 3 may be sensed, eg by a strain gauge, to input further information. Optical or capacitance sensing may replace the ball. A thumb-wheel (10, Fig. 3) may be provided in the casing, eg to enable input of Z-axis data. The connection cable enters the housing through a channel 5 which is angled so that the cable is less likely to foul movement of the mouse or be obstructed by items on the reference surface.

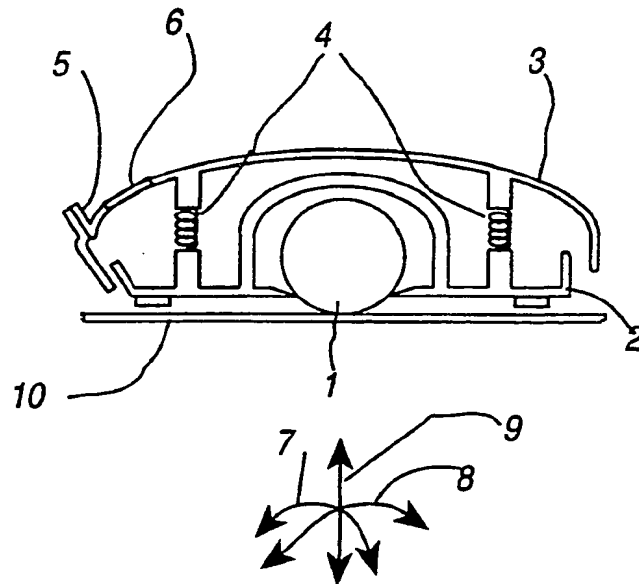


Fig.1.

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

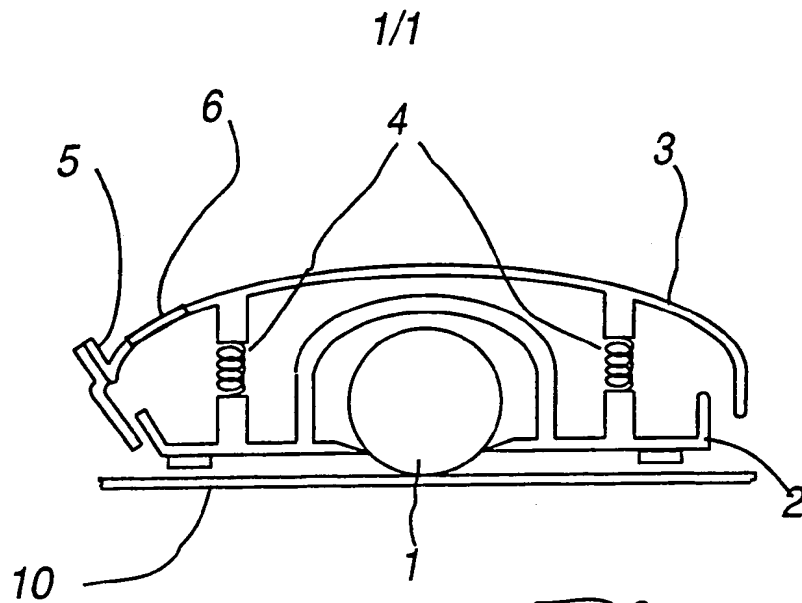


Fig.1.

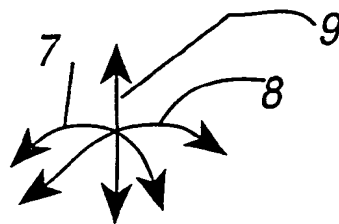


Fig.2.

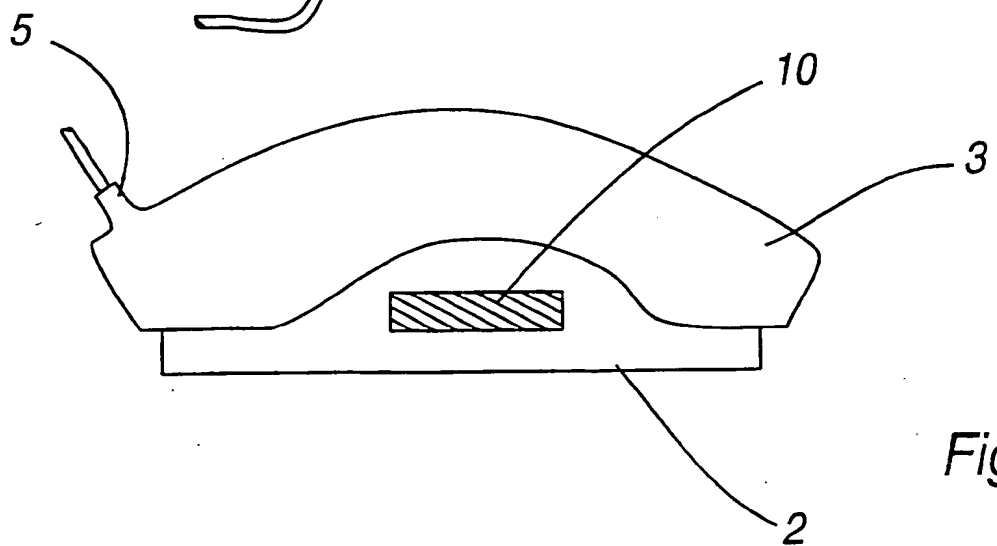


Fig.3.

A MOUSE FOR INPUTTING INFORMATION

This invention relates to a mouse for inputting information to a computer, comprising tracking means and a housing, a first part of the housing for contacting a reference surface.

Such devices are sold by companies such as Microsoft or Logitech, and are available in a number of designs. However, all the designs employ rigid housings and it is difficult to move the hand when grasping the mouse without causing the tracking means to move. Thus the muscles in the hand may tire, and repetitive strain injury is possible if the mouse is used for long periods of time. Also, playful movement of the hand is difficult without inputting spurious information to the computer.

An object of the present invention is to enable these disadvantages to be mitigated.

According to the invention, a mouse as described in the first paragraph above is characterised in that resilient means is provided to enable a further graspable part of the housing to be resiliently moveable in a plurality of directions relative to the first part of the housing.

Using such a mouse, the hand may move the graspable part of the housing to compress and release the housing, or may tilt the graspable part of the housing relative to the other part, without causing the tracking means to move or be disabled. Such hand movements and concomitant compression and/or stretching of the resilient means may be sensed using a sensor such as for example a strain gauge, and a signal from the sensor used to input further information to the computer if desired. The hand therefore does not have to be in a constant orientation relative to a reference surface.

The housing may itself comprise a resilient material and be made in one piece. The housing may as an alternative be in two parts with resilient means such as rubber rods or springs coupling one part to the other.

A data input device for a computer including resilient means is disclosed in EP-0403782-A3. However this device describes a small button which is moveable in only one direction, is not graspable in the hand, and does not form part of the housing of a mouse.

Embodiments of the invention will now be described, by way of example only,

with reference to the accompanying drawings, in which

Figure 1 shows a schematic cross section of a first embodiment of a mouse according to the invention,

5 Figure 2 shows the directions of resilient movement possible for the mouse of Figure 1, and

Figure 3 shows a side view of a second embodiment.

In a first embodiment, shown in Figure 1, a mouse for inputting information into a computer comprises tracking means (consisting of a rotatable tracker ball 1 for contacting a reference surface 10) and a housing 2, 3. A first part 2 of the housing
10 defines a hole through which the tracker ball may protrude. The base of the housing and the tracker ball may both contact the reference surface. Resilient means (in the present embodiment taking the form of helical springs 4) is provided to enable a further graspable part 3 of the housing to be resiliently moveable in a plurality of directions relative to the first part of the housing. The housing also comprises a button 6 for
15 inputting further information to the computer. More buttons or other data input means such as for example thumb-wheels may be present in addition, but are not shown in the figure.

The housing in this embodiment is made of a rigid plastic material which contains electronics and sensor means (not shown) to detect both tracker ball rotation
20 and the relative movement of the two parts 2 and 3 of the housing. The latter is achieved in the present embodiment using a displacement sensor connected to the resilient means. Electrical connection between the computer and this embodiment of the mouse is provided by a cable which enters the housing through a channel 5 which is arranged at a positive angle relative to the reference surface. This arrangement gives
25 the further advantage of making it less likely that the cable will foul the movement of the mouse. This feature also prevents the cable being obstructed by items on the reference surface such as for example pens or rulers.

In this embodiment, the graspable part of the housing, may be moved relative to the other part of the housing in 3 different directions as shown in Figure 2 - namely
30 towards and away from the reference surface (9), and tilting movement giving pitch (8) and roll (7).

To maintain the accuracy and ease of use of the mouse, the resilient movement

should be mainly orthogonal to the reference surface. Gimbals-like movement may be included.

Mechanical equivalents of the helical spring may be used additionally or as an alternative. For example rubber rods or leaf springs made of metal or plastic may be used. The resilient means may be integrated into a moulded housing. The restoring forces in the springs may be adjusted to suit different users. The displacement sensing means may be replaced by a strain gauge.

Additionally or as an alternative to the above resilient means, the graspable part of the mouse may be made of a resilient material such as rubber, enabling movement of part 3 relative to part 2.

Several different tracking means may be employed as alternatives to a tracker ball, such as methods employing optical tracking or capacitance sensors.

In a second embodiment shown schematically in figure 3, part of the housing is equipped with a wheel which may be activated by a thumb or finger of the user. This wheel may be used to input further information (such as for example z-axis data) to the computer.

In general, buttons or wheels or other data input means may be provided on either the first, graspable part of the housing or on the further part of the housing.

The graspable part of the housing in either of the above two embodiments may be provided with wheels or rotatable balls (not shown), which may be sprung, at either side of the housing. Such wheels or balls may contact the reference surface only when the resilient means is in a compressed state. This arrangement provides the added advantage of making the mouse easier to steer in an arc, or in specific directions. In use such a mouse can be compared by analogy with a toy car having sprung wheels (or balls) on which pressure changes are translated into changes in direction.

CLAIMS

1. A mouse, for inputting information to a computer, comprising tracking means and a housing, a first part of the housing for contacting a reference surface,
5 characterised in that resilient means is provided to enable a further graspable part of the housing to be resiliently moveable in a plurality of directions relative to the first part of the housing.
2. A mouse, for inputting information to a computer, comprising a rotatable tracker ball for contacting a reference surface and a housing, a first part of the housing defining
10 a hole through which the tracker ball may protrude, characterised in that resilient means is provided to enable a further graspable part of the housing to be resiliently moveable in a plurality of directions relative to the first part of the housing.
3. A mouse as claimed in any preceding claim, in which the housing is in two parts, one part connected via resilient means to the other.
- 15 4. A mouse as claimed in any preceding claim in which the graspable part of the housing comprises resilient material.
5. A mouse as claimed in any preceding claim in which the relative movement of the first part of the housing relative to the further part is sensed by a sensing means, the output of which is used to input further information to the computer.
- 20 6. A mouse substantially as herein described with reference to figure 1 or figure 3 of the accompanying diagrammatic drawings.

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Patents Act 1977
Examiner's report to the Comptroller under Section 17
(The Search report)

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Relevant Technical Fields

Search Examiner
J L TWIN

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(ii) Int Cl (Ed.5) G05G 9/053; G06F 3/033; G06K 11/18

Date of completion of Search
2 DECEMBER 93

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant following a search in respect of Claims :-
1-6

(ii) ONLINE DATABASE: WPI

Categories of documents

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|-------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| X: Document indicating lack of novelty or of inventive step. | P: Document published on or after the declared priority date but before the filing date of the present application. |
| Y: Document indicating lack of inventive step if combined with one or more other documents of the same category. | E: Patent document published on or after, but with priority date earlier than, the filing date of the present application. |
| A: Document indicating technological background and/or state of the art. | &: Member of the same patent family; corresponding document. |

Category	Identity of document and relevant passages	Relevant to claim(s)
X	EP 346859 A2 (WANG)	1,2,4,5
X	WO 93/04348 A1 (SPACEBALL TECHNOLOGIES)	1-3,5
X	WO 92/08208 A1 (QUEEN MARY AND WESTFIELD COLLEGE)	1-3,5

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).